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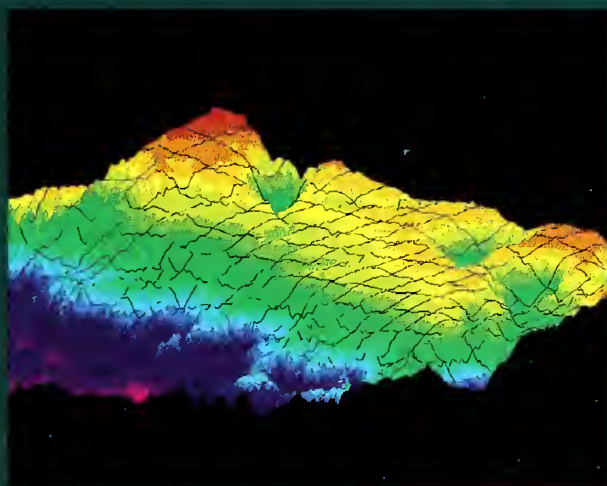
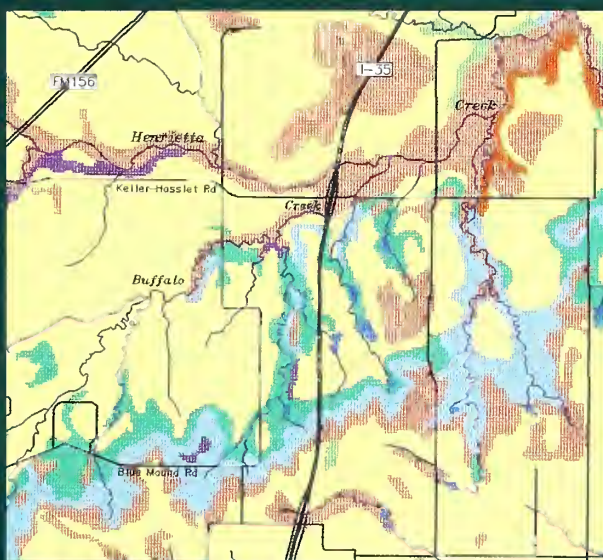


United States
Department of
Agriculture

Soil
Conservation
Service

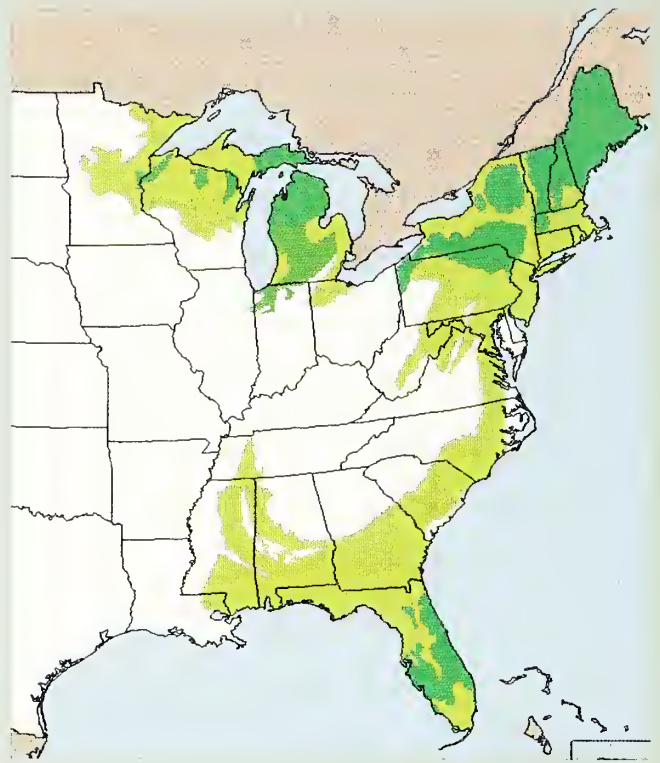
GRASS

Geographic Information System



GRASS GIS

The Soil Conservation Service (SCS) selected the Geographic Resources Analysis Support System (GRASS) as the agency-supported geographic information system (GIS) for use on SCS UNIX-based AT&T 3B2 and 6386 WGS microcomputers. Trade names mentioned are for specific information and do not constitute a guarantee or warranty of the product by the Department of Agriculture or an endorsement by the Department over other products not mentioned. GRASS is a multi-purpose GIS, originally developed by the U.S. Army Corps of Engineers, Construction Engineering Research Laboratory, in Champaign, Illinois. GRASS, a public domain system, is used and supported by several federal agencies, as well as academia and private industry. Continued developments and enhancements by the various users coordinated through the GRASS Interagency Steering Committee help insure that GRASS maintains its capabilities as a powerful yet easy-to-use GIS.



Above: Distribution of highly leached acid soils in Major Land Resource Areas based on National Resources Inventory data and soil series information.



Above: A GIS has four key components: hardware, software, data, and people.

GRASS is UNIX-based, highly interactive, graphic-oriented GIS software, supporting both raster and vector data structures. It performs five basic functions typical of a GIS: data input, storage, manipulation, analysis, and display. In addition to performing these functions with digital map data, GRASS also has an integrated image analysis capability useful in providing photo-image background for thematic maps, or for automated classification of imagery to produce new map layers, such as land cover.

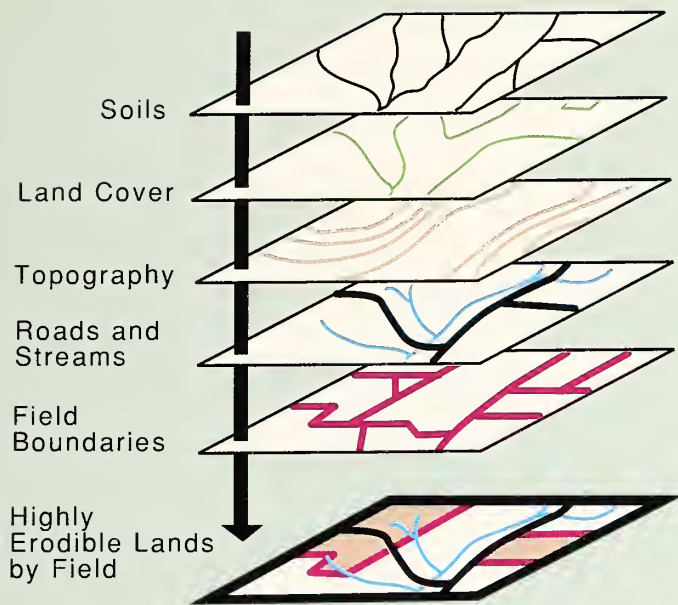
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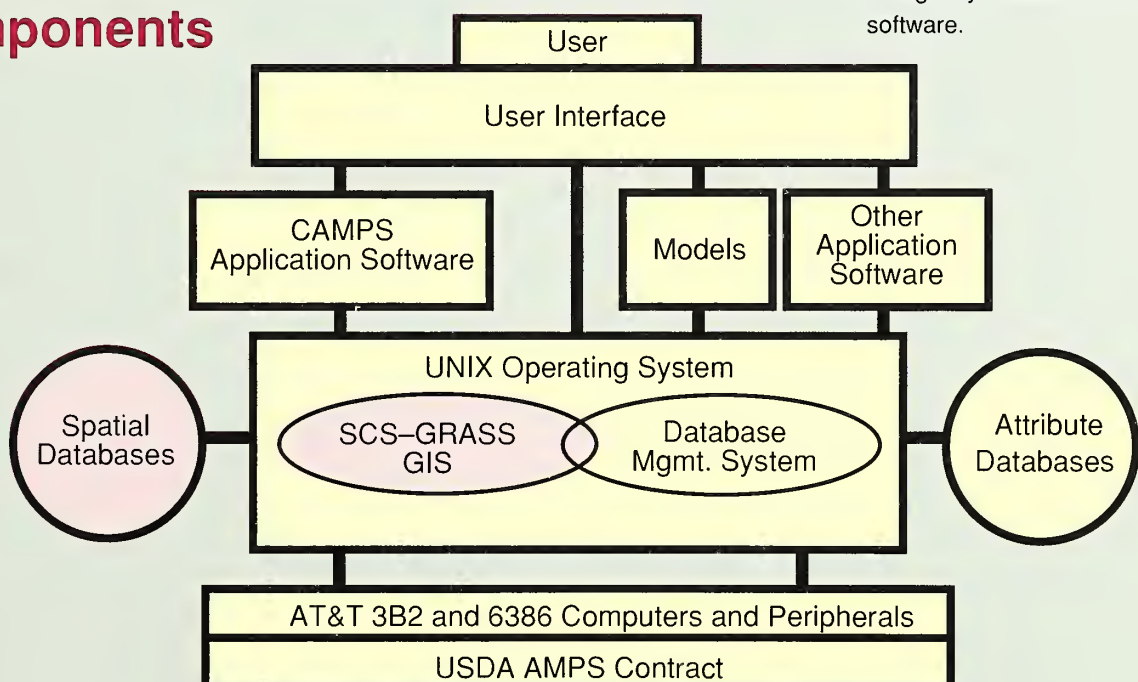
Spatial Databases and GRASS

Spatial information portraying such themes as soils, topography, land cover, roads, streams, and field boundaries are among those data layers typically used in a GIS for analyzing spatial data and producing interpretive maps and related tabular data.



SCS Automation Components

GRASS GIS provides an important and critical component in forming the structure and foundation for agency databases and application software.



The Mission of SCS and GIS

The Soil Conservation Service provides technical help to individuals, groups, organizations, cities and towns, and county and state governments to conserve soil and water resources. The SCS mission covers three major areas: soil and water conservation, natural resource surveys, and community resource improvement.

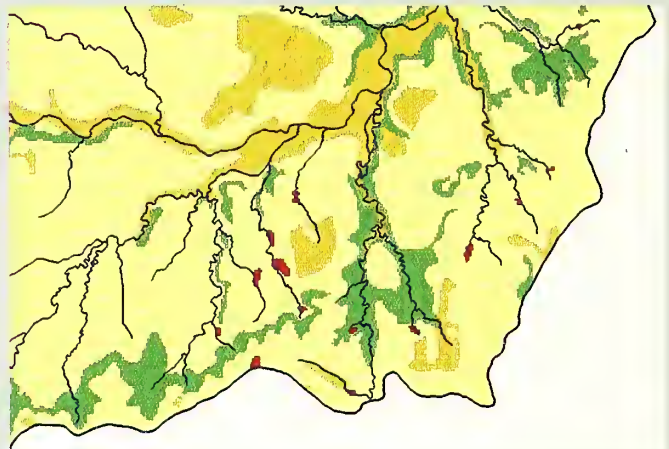
To carry out its mission, SCS has a nationwide network of conservation specialists to help people understand and protect the land and water resources while they use them beneficially.

Spatial information, such as maps and aerial photography, are used extensively by SCS conservationists to convey information about the land and water resources, to analyze and evaluate conservation practice alternatives, and to recommend resource management systems.

For SCS, implementing GIS technology can assist in analyzing and understanding the many spatial resource relationships necessary to provide accurate answers to the complex resource problems of today and tomorrow.

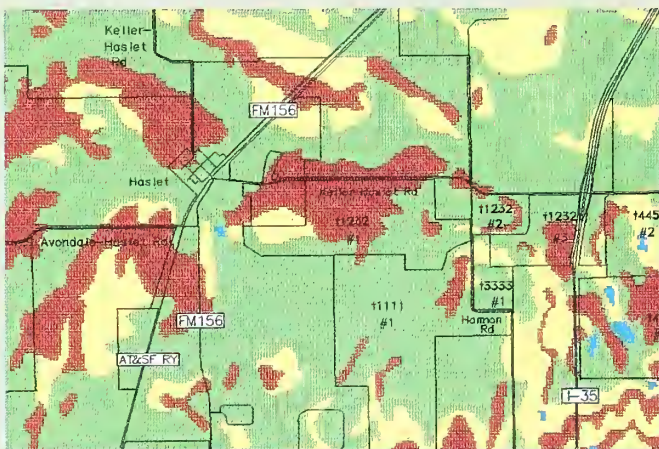
GRASS Applications

- Watershed project planning and monitoring.
- Water quality analysis.
- RC&D project planning and monitoring.
- Natural resource analyses at the county, state, and national level.
- Soil interpretations and other resource analyses for local governments.
- Farm or ranch conservation planning.
- Digitizing soil surveys.
- Delivering soils information to the public.
- Workload analysis and priority setting.
- Cultural resource analysis.



Above: A water quality impact map generated from soils, terrain, land use, and hydrography data. Shown with an overlay of stream locations.

Below: A highly erodible lands (HEL) map shown with an overlay of field boundaries and roads.



Once the appropriate spatial databases exist in GRASS, various types of analyses and maps can be produced, including:

- Highly erodible lands in a county with acreage computed by watershed, community, or land use.
- Areas with potential for a high delivery of sediment to streams.
- Areas eligible for CRP or other conservation programs.
- Slope maps generated from digital elevation data.
- Distribution of cooperators, planned practices, dairy or hog farms, feedlots, ponds, or cropland.
- Areas most suitable for watershed structures.

GRASS and Conservation Planning

Conservation plans are the main tools used by SCS conservationists to deliver technical resource management assistance to the land user. A typical conservation plan includes a map showing where the conservation practices will be used, a record of practices to be implemented, and information on how to install these practices. There is also a soils map with a description of the soils, including information about their uses and limitations.

With the Computer-Assisted Management and Planning System (CAMPS) software, much of the plan development is automated. The GRASS-CAMPS interface is a first step toward automating plan maps and soil maps. The addition of photographic imagery and other future enhancements will make GRASS an efficient planning tool to maintain the spatial data for cooperators.

But even more important than plan map generation, the conservationist with GRASS can use the GIS analysis capabilities to explore more land and water management alternatives than ever before.



Field No.	Amount	Date	Applied	Remarks
1	10 AC.	May 88		Cropland
1	10 AC.	Oct 88		328 - Conservation Cropping Practice Follow a crop rotation to meet the needs of the farm operation. Use and fertilizer will be applied according to soil test results or to desired practice.
1	10 AC.	Oct 88		340 - Cover and Green Manure Crop Plant a winter cover crop of small grain, legume, or other grasses to reduce erosion.
1	500 Ft.	May 89		385 - Field Borders Install field borders 12 feet wide along the inner edge of this field(s). Maintain these field borders according to the attached management plan.
5	3 AC.	May 88		314 - Grass Management Manage the brush in this field(s) by chemical or mechanical means. See the attached information sheet, "Brush Management", for more information.
5	9 AC.	Apr 89		312 - Pasture and Hayland Plant this field(s) in a grass-legume mixture according to the attached information sheet, "Pasture/Hayland Planting".

Conservation Plan
Map

Conservation Plan
Narrative



GRASS and Map Digitizing

The GRASS map development (MapDev) software, a vector-based digitizing system, is one of the tools that can be used by SCS resource specialists and technicians to digitize maps to SCS national specifications.

The digitizing software provides both line and point digitizing; and includes line edit, polygon creation from arc-node files, labeling, map joining, and edit plotting software to meet the requirements for GIS spatial databases.





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